TURNERS FALLS POWER AND ELECTRIC COMPANY, HAMPDEN STATION HAER No. MA-126-A
East bank of Connecticut River, 1500 feet west of
intersection of Depot Street and Boston & Maine Railroad,
and 500 feet downstream of confluence with Chicopee River
Chicopee
Hampden County
Massachusetts

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

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HISTORIC AMERICAN ENCINEERINC RECORD

TURNERS FALLS POWER AND ELECTRIC COMPANY,HAMPDEN STATION

HAER No. MA-126-A

Location:	East bank of Connecticut River, 1500 feet west of intersection of Depot Street and Boston & Maine Railroad, and 500 feet downstream of confluence with Chicopee River City of Chicopee Hampden County Massachusetts USCS Quadrangle: Springfield North, Mass., 1:25,000 UTM Coordinates: 18.696600.4668670
Designer:	Turners Falls Power and Electric Company
Contractors:	Fred T. Ley Company, Springfield, MA, general Raymond Concrete Pile Company, New York, NY, piles
Supervising Engineer:	Robert E. Barrett, Sr.
Turbines & Cenerators:	Ceneral Electric Company
Boilers:	Edge Moor Iron Company, Wilmington, DE
Crane:	Whiting Foundry Equipment Company, Harvey, IL
Dates of Construction:	1917-1918
Present owner:	City of Chicopee City Hall Chicopee, MA 01013
Present use:	Vacant and decommissioned
Significance:	Turners Falls Power and Electric Company built only hydroelectric facilities until World War I, when it constructed the coal-fired, steam-powered Hampden Station to meet increased industrial demand and supplement hydro-generation. Although superficially typical of contemporary water-side steam electric stations, inefficient design features limited the useful operation of this plant. Design problems reflect the effects of wartime exigency, a search for low-cost construction, and perhaps inexperience with steam plants.

Project Information: The City of Chicopee used U.S. Department of Housing and Urban Development funds to demolish the Hampden Station, a National Register-eligible property. In compliance with Section 106 of the National Historic Preservation Act, a Memorandum of Agreement among the City, the Massachusetts State Historic Preservation Officer, and the Advisory Council on Historic Preservation stipulated this pre-demolition documentation, which was prepared November 1992 - January 1993. Demolition, completed in February 1993, removed the boiler and generator rooms described below, along with the stack, leaving the viaduct intact and the station basements, filled with demolition debris, buried.

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Part I - Historical Information*

Summary

Beginning in 1792, the Turners Falls Power and Electric Company and its predecessors participated in three major eras of Connecticut River water use: transportation, direct-drive industrial water power, and hydroelectric power generation. When it merged with the Western Massachusetts Electric Company (WMECO) at the end of 1942, along with two other firms, Turners Falls Power and Electric Company was one of the largest electric utilities in the Connecticut River Valley, following a generation of consolidation among dozens of companies. North of Connecticut, this region's abundant water power resources generated most of the electricity until after World War II. With a few exceptions, Connecticut Valley steam electric plants served smaller firms, even after the rapid, widespread national appearance of steam turbines with improved boiler systems beginning c1905-10 (Stott 1984; Barrett 1986; Hunter and Bryant 1991: 335-50). Turners Falls Power and Electric Company was a regional leader in hydroelectric development, entering steam electric operations relatively late with the Hampden Station during World War I. Inefficient and relatively unsophisticated design features at Hampden Station limited this plant's usefulness, and it only operated full-time for a total of about ten years between its completion in 1918 and its decommissioning in 1962. Planned by company engineers with perhaps more experience in hydroelectric than steam electric design, Hampden Station limitations may also reflect wartime exigencies and emphasis on low first costs and rapid construction.

Corporate Development and Plant History

Soon after the American Revolution, revived West Indies trade and expanded settlement in the upper Connecticut River Valley prompted private investment in canals to circumvent falls on the river. Massachusetts chartered the two earliest corporations in these efforts. In 1792, the Proprietors of the Locks and Canals on the Connecticut River was empowered to enhance navigation above the Chicopee River, and by 1795 opened a canal around the falls at South Hadley. Financial difficulties associated with a project for Great Falls or Millers Falls, in Montague, led to a 1794 split of the Proprietors, with the new Proprietors of the Upper Locks and Canals on the Connecticut River completing canals at Montague and Bellows Falls, Vermont by 1802. Like all the Connecticut River canals built between 1793 and 1829, those of the Upper Locks corporation ultimately proved unprofitable as transportation ventures, and quickly succombed to railroad competition before 1850 (Abercrombie 1925; Kaynor 1976: 51-60; Raber and Malone 1991: 37-41).

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* Capitalized, undated references are to photographs in this documentation.

By the 1840s, owners of Connecticut River canals began to seek profits from sale of water power rights to industrial users, often with new infusions of capital and rebuilt water management structures. Beginning one of the latest but most successful of these conversions, the Proprietors of the Upper Locks and Canals secured a charter change in 1864, ending their navigation obligations and securing rights to develop industrial water power. Two years later, Fitchburg, Massachusetts investors led by Col. Alvah Crocker purchased control of the company, built a new dam and canal at Montague, and reorganized the new operation as the Turners Falls Company, renaming the falls at Montague after 17th-century English military leader William Turner.* The Turners Falls Company laid out industrial and residential lots at the new village of Turners Falls, and by 1878 realized profits from sales of water power and land in a small urban environment dominated by paper companies (Abercrombie 1925; Barrett 1986).

Small electric generating plants for lighting appeared in the Connecticut River Valley in the mid-1880s, including a hydroelectric station on the Turners Falls canal begun in 1886 by the Franklin Electric Light Company. By 1904, Turners Falls Company personnel began plans to generate electricity with the substantial surplus water not previously sold to canal industries. The company's Station No. 1, completed in 1906 on an enlarged Turners Falls canal, generated 1000 kw and only replaced operations of Franklin Electric Light, the new station's only customer. The remaining available hydroelectric resources at Turners Falls quickly attracted a new group of investors from Boston, led by Philip Cabot, which in 1907 gained control not only of the Turners Falls Company but of nearby utilities with electric transmission, hydroelectric, and steam electric facilities. Cabot served as company president for twelve years (Abercrombie 1925).

This new leadership initiated policies typical of the emerging era of consolidation among American electric companies. Integrating central station operations provided steam plant backup for the predominantly hydroelectric base loads in the upper Connecticut River Valley. Interconnecting electric systems, which proceeded rapidly throughout Massachusetts by World War I, increased load and diversity factors** as the utilities took advantage of available demands made by residences, commercial and industrial operations, and street railways over larger areas. With a stronger income base, the Turners Falls Company and its affiliates or subsidiaries concentrated increasingly on electricity rather than water power rents, consolidating all its operations

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*In 1676 during King Philips War, Turner led a badly-planned but successful attack on Indians at the falls, in which both sides lost many killed -- among them Turner.

**Load factor is the ratio of average load to maximum load; a higher ratio reflects more complete -- and profitable -- use of available generating capacity. Diversity factor is the ratio of total customer maximum demands during a given period to maximum demands at transformers at a given moment. Increased customer diversity tended to increase load factor (Hughes 1983: 217-18; Hunter and Bryant 1991: 276-83).

1915 as the Turners Falls Power and Electric Company, initially a transmission subsidiary organized in 1910 under another name. By the onset of American involvement in World War I, Turners Falls Power and Electric had expanded into the Springfield-Chicopee area, building substations in each of these cities, and participating in the gradual shift towards purchased power among commercial and industrial businesses. Most significantly, the company expanded its hydroelectric generating operations at Turners Falls c1912-16 to take full advantage of permanent and surplus water power. Station No. 1 was enlarged by 1913 to provide 5000 kw, and a new, much larger Station No. 2 was completed in 1916 following construction of a new dam and a canal extension. Station No. 2, re-named the Cabot Station in 1919 after the retirement of the Turners Falls Power and Electric president, was completed with a 42,000-kw capacity, increased to 48,000 kw in 1917 by heightening canal walls. With these projects, the company had a total hydroelectric permanent load of 33,000 kw, and another 20,000 kw with surplus water (Abercrombie 1925; Hughes 1983: 291-3; Barrett 1986).

Increased wartime power demands led to the 1917-18 construction of the Hampden Station in Chicopee, near the southern edge of the Turners Falls Power and Electric service area, to supplement hydroelectric capacity and provide power during times of low water. Little if any written documentation of Hampden Station planning or construction has evidently survived. As the United States entered the war in April 1917, Turners Falls Power and Electric purchased a 38.5-acre parcel on the Connecticut River, described in Part II below; company engineers probably designed the plant (WMECO 1971; HAMPDEN STATION; Northeast Utilities [historic views]). The Fred T. Ley Company, a large Springfield construction firm which also built most of the Cabot Station, acted as general contractors (*Electrical World* 1917; Clouette 1987).

Earlier steam electric relay facilities, provided by companies affiliated or interconnected with Turners Falls Power and Electric, were generally much smaller than the 30,000-kw Hampden Station; only the Springfield steam plant of the United Electric Light Company, linked to a Turners Falls Power and Electric affiliate in 1912, may have been in the size class of Hampden Station by 1917 (Barrett 1986). The new station nearly doubled the firm's permanent load capacity, and was designed for expansion to perhaps 120,000 kw.* Within several years after its opening in September 1918, however, Hampden Station was reduced to standby or perhaps non-generating switching service, with a skeleton crew; when re-activated to meet growing wartime needs in 1939 the planted needed a large complement of newly-trained staff (personal communications, Anthony M. Lipski). The station was slightly damaged by the Connecticut River's worst recorded flood in 1936 and by the 1938 hurricane. In 1940, the City of Chicopee erected an earthen flood wall about 800 feet east of the plant to protect nearby industrial properties (WMECO 1955a, 1971; Figure 3).

*Ultimate intended Hampden Station size is ambiguous in available data; the only statement on this point located to date (*Electrical World* 1917), written just prior to construction, identified the first phase as a 40,000-kw station, to be expanded to a 120,000-kw station with about 87,500 square feet of floor space -- almost five times the size of the 30,000-kw station actually erected.

The short initial full-time operating history of Hampden Station etemmed from four principal factore: many inefficient design elements which made station operations relatively expensive; enhancement of hydroelectric potential at the Turners Falls stations; increased post-war connections and consolidation with other regional utilities; and decreased Connecticut Valley power demands as some industrial activity diminished in the 1920s. Hampden Station design probleme, discussed below in more detail, are reflected in the plant'e operating requirements of about two pounds of coal to produce one kilowatt-hour of electricity, a figure reflecting good steam electric design of c1910 rather than c1920; by the latter period, modern plants required about 1.2-1.5 pounds (WMECO 1963; Hunter and Bryant 1991: 350, Table 24). The steam plant's somewhat retrograde character contrasted sharply with the Cabot Station, a nationally-recognized example of good hydroelectric design (Clouette 1987). The contrast exacerbated a basic difference between water- and steam-powered generating stations: hydroelectric stations, with their water control structures, were costlier to build but less expensive to operate than coal-fired steam electric plants with relatively large labor forces (Hunter and Bryant 1991: 352-57). As World War I ended, Turners Falls Power and Electric decreased reliance on coal by joining with the Connecticut River Power Company, in New Hampshire, to develop storage reservoirs on the upper Connecticut for hydroelectric stations. During the 1920e, continuing growth of regional utility interconnections through the Connecticut Valley Power Exchange, organized in 1925, further reduced the need for Hampden Station power as the Hartford Electric Light Company joined the grid of utilities in western Massachusetts (Abercrombie 1925; Barrett 1986).

To retain ownership control in the face of increased utility takeovers by outside financial interests, many Massachusetts firms created a holding company in 1927, Western Massachusetts Companies, to acquire capital stock control of the member companiee. This voluntary trust also encouraged pooling of technical expertise and contributed to corporate consolidations, culminating in the December 1942 merger of the remaining four firms -- Turners Falls Power and Electric, the Pittsfield Electric Company, the United Electric Light Company, and the Western Massachusetts Electric Company -- as the Western Massachusetts Electric Company (Barrett 1986).

Heightened industrial power needs for World War II production led to the full-time re-activation of Hampden Station, and early post-war growth in electrical demands warranted continued plant operations. This same growth spurred construction of a new West Springfield steam plant in 1949, however, which again reduced the need for the less efficient older plant; the West Springfield plant opened with a 50,000-kw capacity, increased to 200,000 kw by 1957. Although a number of plant components were upgraded c1951-56, often with used materials, Hampden Station was again operated only irregularly during this period. In 1962, WMECO ceased station operations, dismantling the boilers and generating equipment the following year. At the end of 1963, WMECO sold the station and most of the associated property to a scrap metal dealer who removed most plant equipment and unsuccessfully attempted to operate a demolition material landfill at the site. After a second euch attempt by another owner failed c1971-84, the City of Chicopee took possession in 1985 and was unable to develop economically viable uses for the station (WMECO 1955a, 1955b, 1955c, 1956; Barrett 1986; City of Chicopee 1992).

Hampden Station Design and Operation Issues

The Hampden Station was a relatively large, World-War-I-era steam electric plant. Its 30,000-kw capacity was comparable to many urban stations, and if expanded to 120,000 kw it would have been a large station by any standard (Croft 1917: 287). It was located on a large waterway adjacent to rail service, in this case the Boston & Maine Railroad running along the east side of the Connecticut River (Figures 2-3). As described in Part II, the station had mechanical handling facilities which brought coal to overhead bunkers, from where the coal dropped down chutes to stoker-fed boilers which powered steam turbines. Planned for expansion with an unfinished rear wall, the station also had carefully-detailed finished exteriors visible from the river or the river's west bank, adding a dignified tone often found in large contemporary public utility projects. Superficially, this station shared many features with up-to-date coal-fired central stations (Stilgoe 1983: 105-32, 1985).

Hampden Station's size and appearance was not matched by effective contemporary engineering, however. Probably from a combination of wartime exigency and inexperience with steam plant planning, Turners Falls Power and Electric Company engineers created a plant vulnerable to fuel interruptions, with much thermal inefficiency and unsophisticated electrical controls. Power systems before c1900 usually consisted of many small stations, any of which could drop from service without much impact. After c1900 the trend in large cities was towards larger and fewer stations with greater dependence on each station. To insure reliability the stations were engineered for continuous operation under any projected emergency. Multiple fuel sources, high mechanical redundancy, and complex grid interconnection control were the rule. Hampden Station is of interest because it straddles these two system philosophies (Croft 1917: 264).

Plant designers of this period generally preferred two forms of coal supply to insure continuity in the event of strikes. A combination of barge and rail supply was considered best, or service from two rail lines for plants on marginal navigable rivers (Fernald and Orrok 1916: 238). The Hampden Station was served only by the Boston & Maine; any Turners Falls Power and Electric expectations for possible water-borne coal delivery were unrealistic given the history and contemporary status of navigation on the Connecticut River (cf. Abercrombie 1925: 21; Raber and Malone 1991: 23-4, 42-3). Given that restriction, best contemporary practice would have provided a 10,000-ton coal pile with dragline or portal crane access giving three months supply (Fernald and Orrok 1916: 236). At Hampden Station, coal was dumped around a long trestle and was placed in a crusher by a traveling crane. The stockpile system here was relatively small, probably holding about 5,000 tons, with crane boom radius and trestle length determining the available reserve. Boiler house bunkers held about a three-day supply (personal communication, Anthony M. Lipski). It is doubtful the station had the minimum reserve suggested during that era with a single rail carrier.

Low initial cost and low maintenance, rather than thermal efficiency, seem to be the main criteria exercised in equipment choices. The station had eight Edge Moor Iron Works boilers, each shown on a historic drawing with 650 hp, or 5200 hp total (HAMPDEN STATION). This nominal rating is far short of the 40,000 electrical horse power of the plant*. It was common at the time to force boilers continuously to 400% of their rating with 600% peaks not uncommon (Croft 1922a: 233). Even at 600% the rating falls short, casting doubt on the accuracy of the drawing, but boiler pressure was probably rather low, preventing the use of high efficiency multi-cylinder compound turbines. The practice of running boilers at high overloads enabled a smaller low-cost plant to meet the output of larger stations. Multiple-retort underfeed stokers, made by Sanford Riley Stoker Company, pushed green coal from below the fire bed with electric-motor-powered reciprocating rams while air under pressure was blown from adjacent tuyeres. This was the contemporary state of the art in low smoke, high output stokers of the time, and in context of overall plant design are almost an anomaly (de Lorenzi 1952: 42). They may have been chosen because they were the only type which could fire a boiler plant at the forced ratings evidently used here. These stoker types were also often specified solely (and were guaranteed) to meet local smoke ordinances (Figures 6-7).

The two prime movers were General Electric impulse-reaction single-cylinder units, which combined the best features of the original Parsons reaction turbine wheel, with improvements of the American Curtiss type impulse wheel (Church 1935: 8; personal communication, Anthony M. Lipski). Turbine steam exhausted straight down to jet condensers. In this system of condensation, exhaust steam is cooled by direct mixing with sprays of water -- supplied here by centrifugal pumps with suction from the Connecticut River -- with much of the condensed steam dumped into nearby waters. Although jet condensers had lower first cost and maintenance than the surface condensers, already in use, which fed hot water back to the boilers, selecting jet condensers involved a train of subsequent requirements (Croft 1922b: 322). The low temperature feed water produced by jet condensers dictated a feed water heater. Steam for a heater in a jet-condensing plant has to come directly from the live steam circuit, which is wasteful, or as exhaust from steam-powered pumps which are not as efficient as electric ones. The Hampden Station also lacked economizers, often installed in contemporary stations of this size, which pre-heated boiler feed water with waste heat rising to the stack. Economizers were expensive and labor intensive, but they provided very hot feed and could pay for themselves in three years (Fernald and Orrok 1916: 205).

Hampden Station electrical controls, with all switchboards and generator high tension switches on one side of the turbine room floor, were somewhat archaic, and more appropriate for an isolated plant or substation than a central station. Most plants of the period had raised control rooms overlooking the turbine hall, and generator high tension switches arrayed in galleries above floor level. The asymmetrical arrangement of Hampden Station electrical controls made both turbine-generator units potentially vulnerable in the event of

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*1 kw equals approximately 1.33 hp.

fire or other damage. Central station control rooms of the period also monitored steam conditions in boilers and turbines, and relayed starting orders to the floor with ship-type telegraphs. Hampden Station's steam turbine controls were antiquated with control boards in front of each unit.

Overall, Hampden Station siting, equipment and operations indicate a lack of a clear plant rational. If designed to supplement the load over the entire Turners Falls Power and Electric system during periods of low hydropower availability, the station should have had more advanced electrical controls. If its role was as a peaking plant to smooth out supply at one corner of the system, Hampden Station would have operated better with surface condensers and economizers which give greater flexibility to cover wide short-term demand swings, although the low nominal boiler capacity coupled with heavy forcing could support this role (Meyer 1912: 164). Since perhaps only intermittent operation was anticipated to meet increased wartime demand, plant designers may have planned for a short-term problem that did not merit the capital outlay for a state-of-the-art central station (WMECO 1963). Such decisions not only created thermal plant efficiency, but probably required more staff than might otherwise have been necessary: full-time operations here required three shifts of at least two dozen men each (personal communication, Anthony M. Lipski). Hydroelectric stations and more efficient steam plants had less costly labor forces. It is probably no coincidence that Hampden Station stood idle, or nearly idle, most of its life.

Part II - Descriptive Information

The Hampden Station is located on a modified natural terrace above the Connecticut and Chicopee rivers, originally an irregular surface some 56 feet above mean sea level, between the floodplain of the Chicopee to the north and a cove of the Connecticut, with associated wetlands, to the southeast. Turners Falls Power and Electric acquired a 38.5-acre site at this location, but completed all components described below within a smaller area of about 9 acres. In 1920, the company sold about 6.2 acres in the northeast portion of the property, along the Boston & Maine Railroad and the Chicopee River, to the Moore Drop Forging Company (WMECO 1971; Figures 3-4).

Station builders Fred T. Ley Company dug about 20 feet below the original terrace elevation of 56 feet to create station foundations, using the excavated material to create a finished grade around the station 10 feet above the original surface (HAMPDEN STATION). This material, along with fill excavated on the north side of the Chicopee River and brought to the site on a temporary railroad trestle, also served to construct an unpaved vehicular access from the lower end of Depot Street to the east. Coal and ash deposits associated with station operations continued to raise grades around the station. The natural and artificial surfaces slope steeply to the adjacent floodplains and the Connecticut River, especially near the southwest and southeast sides of the station building containing the boiler and turbine rooms (Turners Falls Power and Electric Company [historic views]: 77, 85, 86).

The station originally included eight principal components, described below in earlier and late 1992 conditions:

1. a railroad viaduct on which coal was delivered, and fed into a boiler room on an elevated conveyor;
2. the boiler room and its basement, supplying steam to two impulse-reaction turbines in an adjacent turbine room, and creating ash disposed by small cars via a small elevated track system leaving the basement;
3. the track system for the ash cars;
4. a stack for venting of boiler gases;
5. the turbine room, in which each turbine powered a turbo-generator, with condensers and reclaiming oil tanks in the turbine room basement;
6. a condenser water intake on the main channel of the Connecticut River;
7. a condenser water outfall to the cove southeast of the station;
8. a transformer yard where voltage produced in the turbine room was increased for distribution to the company power grid.

Viaduct and Conveyors

The viaduct carries a single line of standard-gauge railroad track about 760 feet over wetland floodplain, running in a curved alignment from the edge of a modified natural terrace at the lower end of Depot Street nearly to the Connecticut River, passing north of the cove and south of the boiler room (Figures 3-4). Originally, the viaduct was a timber structure with some concrete casing of trestle support bottoms, but coal ash acids probably required a significant, undocumented rebuilding. Now, triangular concrete piers support timber track ties and walkways on either side of the track over the eastern 475 feet; the wood members are badly deteriorated. Each pier is 11.5 inches thick, 7'9" wide at the top, about 20 feet high, and about 14 feet wide at the bottom. Piers are spaced at 12'9" centers along the easternmost 295 feet, with every third pier interval for most of this distance filled by a concrete block, reaching to about 2 feet below the tracks with a triangular-sectioned top covered with iron plates. Concrete beams 11.5x14 inches in section connect the intervening free-standing piers, about mid-way along pier height. Along the next 180 feet, piers are spaced at about 11'4" intervals, all of which are filled with the iron-capped concrete blocks, serving to divide coal dumped from rail cars along either side of the viaduct. West of this section, a 30-foot-long concrete vault contains remains of a hopper and coal crusher, which passed coal to an electric-motor-driven inclined belt conveyor running about 140 feet under the tracks. The conveyor is housed in a concrete chamber with an iron-plated triangular concrete roof, all of which is supported by concrete piers, similar to those noted above and spaced at about 8-foot intervals. Most of this conveyor survived in 1992. Beyond the conveyor, the viaduct ends in concrete piers at about 23-foot centers, connected by concrete beams carrying the track (VIEW SOUTHWEST OF VIADUCT NEAR EAST END; DETAIL VIEW SOUTHWEST OF VIADUCT TRACK...; Turners Falls Power and Electric Company [historic views]: 113, 118, 137, 157).

During station history, several cranes no longer on site, fed the conveyor system leading to the boiler room, and in some cases moved coal cars along the viaduct. Cranes included a Brownhoist self-propelled traveling electric locomotive crane installed during originally construction, a later Lima stationary crane requiring hand-powered movement along the track, and another, used, Brownhoist locomotive type purchased in 1956. Moving along the track, the clamshell-type cranes picked up bituminous coal from piles along the viaduct and dropped it into the hopper and crusher beneath the track, where the conveyor lifted the crushed coal to the lower end of another inclined conveyor capable of moving 100 tons/hour. The second conveyor, at right angles to the first, was driven by electric motors at its upper and lower ends, and brought coal into the rear, southeast corner of the boiler room, to the end of a coal bunker system noted below. Only the uppermost fragments of the second conveyor survived in 1992 (VIEW SOUTH OF NORTHEAST FACADE AND STACK; VIEW NORTHWEST OF SOUTHEAST FACADE AND STACK BASE; VIEW SOUTHEAST OF TRESTLE, COAL CONVEYORS...; HAMPDEN STATION; personal communication, Anthony M. Lipski; WMECO 1956; Turners Falls Power and Electric Company [historic views]: 136).

At the lower or eastern end of the conveyor under the viaduct, an elevated 33-foot-long, 9-foot wide concrete structure extends north, perpendicular to the viaduct on two 8-foot-high levels, with the lowest level ending beneath the coal conveyor. This undocumented structure may have been part of an original ash disposal system dismantled by c1940 (AERIAL VIEW TO EAST; VIEW SOUTHEAST OF TRESTLE, COAL CONVEYORS...; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 130).

Boiler Room and Turbine Room

The boiler and turbine rooms, with associated structural and mechanical components, form the core of the Hampden Station. The boiler room is 104x101 feet, and the turbine room is in most places 107x80 feet. Including a 21-inch-thick brick wall between the rooms on the main floor, the two rooms extend a total of about 183 feet, excluding an alcove in the turbine room and locker room and entrance structures discussed below. These rooms are contiguous, wrapped together in a relatively uniform exterior shell, and closely linked mechanically, but each room is structurally distinct, reflecting different functions and structural requirements. The floor plans of the rooms are not mutually aligned, and independent column placement in each room resulted in pedestrian connecting doors which are fully symmetrical only in the boiler room (Figure 5; VIEW SOUTHWEST OF TURBINE ROOM INTERIOR...; HAMPDEN STATION).

Foundations

Foundations of each room extend to or below Connecticut River levels, and are supported by concrete piles to preclude subsidence of the massive structures above. The heights of basement-level equipment differed between the two rooms, so that basement floor levels are about 12 feet apart although a common main floor elevation of 73.5 feet was established, well above most recorded flood levels at the time of station construction.

The boiler room is essentially a network of steel columns, dividing boiler walls and supporting coal bunkers, flue ducts or breeching, and associated catwalks. To support these relatively evenly-distributed weights, along with coal and ash hoppers, and ash cars operated in the basement, the boiler room foundation consists of a 5-foot-thick reinforced concrete slab and right-angled reinforced concrete columns about 17 feet high beneath the steel columns in the superstructure. There are concrete-capped pile clusters beneath the slab at each column location. Basement columns and beams define seven bays along each boiler room axis, supporting boiler room columns and boiler walls, spaced as shown in Figure 5. Basement columns along the approximately 3-foot-thick exterior walls are 30x26 inches. Except for the 30-inch-square columns forming the widest bay, other basement columns are 20 inches square. Concrete beams 6 and 18 inches thick between columns provided additional support for the 12-inch-thick concrete floor of the superstructure and boiler walls (HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 30).

The turbine room is a large open space with two limited areas of extremely heavy equipment -- the turbine and generator installations. No interior columns were needed, but other structural requirements included basement room for 18-foot-high condensers and main floor walls strong enough to carry an 80-ton-capacity overhead crane. Foundations included a 1-foot-thick reinforced concrete subfloor beneath an northeast-southwest array of 3-foot-square concrete beams on 6-foot centers, carrying the approximately 9-inch-thick concrete basement floor. The array of beams beneath the floor served as a hot well for storage of condensed steam, for operations described below (cf. Croft 1923a: 422). Most of the 12-inch-thick concrete floor of the superstructure, about

29 feet above, is carried by 2-foot-square concrete columns and concrete beams of 2x2 or 2x4 feet (DETAIL VIEW NORTH OF TURBINE ROOM FOUNDATIONS; HAMPDEN STATION).

Beneath each turbine and generator set, massive round-arched concrete supports provide additional foundations covering about 40x18 feet, with bases which also support some of the floor columns. These arched foundations were unusually tall concrete structures. During the era of station construction, both monolithic and reinforced types were used, with the latter used only on the largest units; the nature of the Hampden Station examples is unclear in construction photographs. The battered sides suggest a solution to excessive compressive loads in tall monolithic constructions, and also provided a large pile-bearing surface. After c1915, structural steel foundations became more common for units over 15,000 kw, but here the extraordinary 29-foot height may have ruled out this type of construction due to risk of vibrations (Croft 1923a: 424-26). This height was probably dictated by conflicting requirements of flood protection and reliable condensing water supply. The water intakes had to be located below the lowest recorded river level, and the circulating pumps supplying the condensers could not be mounted more than 20 feet above that point. At the same time, the electrical equipment needed to be protected from record flood levels. Thus the foundation height is essentially governed by the flood range of the Connecticut River (Fernald and Orrok 1916: 99; MacNaughton 1950: 595; DETAIL VIEW NORTH OF TURBINE ROOM FOUNDATIONS; DETAIL VIEW OF JET CONDENSER UNDER TURBINE FOUNDATION ARCH; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 116).

Concrete piles are concentrated beneath the arched supports, the floor columns, the 3-foot-thick exterior basement walls, and the partition wall between the turbine and boiler rooms. Much of the exterior basement wall is exposed on the northeast or rear wall of the boiler and turbine rooms, and has beam slots left for a plant expansion anticipated at the time of construction (HAMPDEN STATION; VIEW SOUTH OF NORTHEAST FACADE AND STACK).

Superstructure

Exterior

Except on the unfinished northeast facade, the one-story superstructure of the boiler and turbine rooms is enclosed by steel-framed walls of dark red face brick and cast concrete, 60 feet above the floor and in most places 2 feet thick, with steel-framed through-truss roof supports beginning 46 feet above the floor. The finished walls form uniform parapets around the varied roof heights of the two rooms. The undocumented and inaccessible roofing is probably of concrete. Roof and wall heights were probably established by boiler room coal bunker and flue requirements. Steel-framed, hip- and/or gable-roofed monitors extend northeast-southwest over the center of the turbine room, and over the second and sixth bays of the boiler room, providing light and ventilation. Between the boiler room monitors, a flat-roofed conveyor house covers the central bay over the coal bunkers (VIEW SOUTHEAST OF SOUTHWEST FACADE; VIEW SOUTH OF NORTHEAST FACADE AND STACK; VIEW SOUTH OF NORTHWEST FACADE; VIEW NORTHWEST OF SOUTHEAST FACADE AND STACK BASE...; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 111, 132, 133).

Visually unencumbered by the stack and locker room structure which obscure parts of the southeast facade, the northwest and southwest facades present the most consistent appearances. Round-arched windows, with concrete sills and keystones, light the boiler and turbine rooms, and dominate the middle sections of a tripartite facade with some Renaissance Revival elements. A 8"2'-high cast-concrete base with molded top, reaching the upper elevation of the basement story, wraps around all three finished facades, and supports cast concrete pilaster bases 3'5" high between windows. Low basement windows, 12'11" long and 3'9" high with four-over-four tilt panels, punctuate the base of the southwest and northwest facades, with two on the latter side once serving as air intakes. On these two facades, window spacing defines bays -- nine on the southwest, five on the northwest-- which do not correspond to any interior spatial divisions. Facade bays are centered 19 feet apart on the southwest side, and 20 feet apart on the northwest side, with the respective windows separated by brick pilasters 6'1" and 4'10" wide; respective window openings are 14'4" and 13'5". With these windows and spacing, the required structural symmetry and interior dimensions of the boiler room resulted in 9-foot-wide end pilasters on the southwest facade, extending the facade past the main body of the turbine room to establish a large return seen only at the northwest corner. The corresponding alcove inside the turbine room appears to have no other function; overhead crane length may have precluded a wider turbine room and a straight northwest wall (Figure 5; VIEW SOUTHEAST OF SOUTHWEST FACADE; VIEW SOUTH OF NORTHEAST FACADE AND STACK; VIEW SOUTH OF NORTHWEST FACADE; VIEW NORTHWEST OF SOUTHEAST FACADE AND STACK BASE...).

Typical arched windows on the northwest and southwest facades are 38 feet high and 13 feet wide, with chain-operated tilt panels arrayed with metal-framed eight-over-eight and six-over-six lights. A squat, 20-foot-high, 17'6"x56'6" office structure with scaled-down facade treatment blocks the center three bays of the southwest facade and truncates the high windows. A 16-foot-high garage door formerly occupied the bottom of the next bay to the southeast, accessed by a ramp leading up to the offices. Away from the return bay, the northwest facade brick surfaces below the entablature are undecorated except for a concrete string course linking arch springlines; similar treatment appears on the southeast facade. The southwest facade and the entire northwest corner return are finished more robustly, with continuous, horizontal raised brick panels carried through the arch surrounds as radial lines. This rusticated effect is carried around the southwest corner of the boiler room in a quoin-like return. Keystones above the raised-panel bays meet the concrete architrave, with shallow raised bands, which wraps around all three finished facades, matched by similar cornice treatment. Indented panels of brick headers in these same bays punctuate the frieze panel, elsewhere plain (VIEW SOUTHEAST OF SOUTHWEST FACADE; VIEW SOUTH OF NORTHEAST FACADE AND STACK; VIEW SOUTH OF NORTHWEST FACADE; VIEW NORTHWEST OF SOUTHEAST FACADE AND STACK BASE...; DETAIL VIEW NORTH OF LOCKER ROOM...).

When first completed, a free-standing sign on a metal framework rose above the southwest facade, facing the Connecticut River (e.g., Abercrombie 1925: 20):

HAMPDEN STATION
TURNERS FALLS POWER AND ELECTRIC COMPANY

The sign was removed some years ago.

The southeast facade is much more subdued and asymmetrical, and is thoroughly tisd to boilar room structure. Exterior and intarior bay divisions match. The basic fenestration pattern is an 11-foot-high round-arched window, with concreta sill and the concrete keystone and string course treatments seen on the other finished facades, above a 7'8"-wide blank brick band and a 20'7"-foot-high rectangular window. The metal-framed windows are 9'5" wide except in tha aastern bay (whose windows are about 5 inches narrower), and in the rectangular units hava aight-over-eight lights. Pilasters are 3'6" wide. In the central bay, the 27'3"-high flue to the stack, with a concrete bottom band and a continuation of the concrete architrave above, replaces an upper window. The wsstern bay is windowless, filled instead with the return from the southwest facade. During the 1940s, Western Massachusatts Electric Company built an attached, 21'7"-high, 21'x39'2" locker room of common brick on the west end of this facade, with two rows of plain windows and simple corbelled detailing. Lockar room construction truncated the lower window in the second bay from the west (VIEW NORTHWEST OF SOUTHEAST FACADE...; DETAIL VIEW NORTH OF LOCKER ROOM...; personal communication, Anthony Lipski).

The only exterior doors used during station operation were on the southwest side, through or around the office structure. There was originally a 5'10"x8'3" pedestrian door on each short end of the office, with the northern one approached via a 7'9"-wide concrete stairway. Somstime after c1950, an earlier, undocumented porch over the stairway was replaced with a stark common-brick snclosure entered through a 3'x7' door. On the south side, a 10-foot-wide ramp, 4 feet from tha boiler room wall, ran about 61 feet to the pedestrian door from the original southmost corner of the boiler room. The ramp served truck dslivsries of material taken through the garage doors noted above, although few if any vshicles drove into tha boilar room with tha limited turning radius available (VIEW SOUTHEAST OF SOUTHWEST FACADE; DETAIL VIEW NORTH OF LOCKER ROOM...)

The unfinished northeast facade is steel-framed, with terracotta hollow tile walls coverad with metal lathe and stucco. The four bay divisions on the turbine room match those on the southwest facade, while the boiler room's seven bays follow largely from the interior column spacing. Boiler room windows are nearly identical in size and arrangement to those seen on the southeast facade, and are arrayed in two groups of three bays flanking a wide blank bay with a 14'6"-high, 9-foot-wide roll-up door. Turbine room windows like those seen on the northwest and southwest facades fill the southern three bays, with the fourth partly occupied by a 20-foot-high, 14'6"-wide roll-up door. The roll-up doors, wall above ground levels, were never used during station operation and were probably intended primarily as connections to the never-built expansion project. Rail tracks in the turbine room, extending through the roll-up door there, were tied to a tsmporary construction trestle built to install equipment via a temporary or removed spur line (VIEW SOUTH OF NORTHEAST FACADE AND STACK; VIEW WEST...; personal communication, Anthony Lipski).

After acquiring the property in 1985, the City of Chicopee blockad all exterior ground-level doors, basement windows, and lower sactions of main-floor windows with corrugated metal or angle iron. This left antrance to the interior through tha turbine room roll-up door, left open and fillad with plywood and a pedestrian door, with access via laddsrs brought to the site.

Interior

The interior includes four radically different spaces: the boiler room, the turbine room, the small office complex, and the added locker room. Each space is a self-contained functional unit with no architectural relation to any other space. Aside from the differences in room surface treatments, this starkly functional plan emerges in the placement of three 3x7-foot pedestrian doors between the boiler and turbine rooms. Centered on the end and central boiler room bays along the dividing wall, between pilasters unrelated to those in the turbine room, the doors are symmetrically placed only on one side of the wall (Figure 5; VIEW SOUTHWEST OF TURBINE ROOM INTERIOR...).

The boiler room has interior walls of common brick on the finished sides, with shallow pilasters between the windows. Steel I-columns, 8 and 14 inches square, act as supports for the boilers, bunkers, hoppers, and flues or breeching which fill the room. One concrete stairway along the southwest wall led to the basement (Figure 5; VIEW SOUTHWEST OF BOILER ROOM FIRING AISLE).

The finely-detailed turbine room is an airy contrast to the boiler room. Faced with tan finish brick above a wainscot of dark lime-green tile along the finished walls, this room is accented by the large windows and by 34-foot-high, stepped-back pilasters projecting 2'2". Except where truncated in corners, the pilasters have faces of 4'3" and 4'6" on, respectively, the long and short sides of the room, with spacing determined by the exterior window openings. The wainscot treatment, of 6-inch-square tile, is 7'9" high except under windows, where it reaches 3'11". The pilasters on the long sides of the room sheath I-beam columns which carry 1x4-foot I-beam rails for an 80-ton-capacity traveling crane made by the Whiting Equipment Company. Decorative iron ell brackets, 3 feet on a side, support former incandescent light fixtures. The floor was dominated by the two turbine, generator, and exciter installations, separated by a 31x25-foot railed opening through which steam reached the turbines. Two concrete stairways along the southeast wall led to a concrete perimeter balcony platform around three sides of the basement, from which the boiler room basement floor was also accessible through two open doorways. All main floor openings have been covered with plywood (Figure 5; VIEW SOUTHWEST OF TURBINE ROOM INTERIOR...; VIEW NORTH OF TURBINE ROOM INTERIOR...; VIEW WEST OF TURBINE ROOM INTERIOR...; Turners Falls Power and Electric Company [historic views]: 90).

The office structure, accessed through one door in each of the two main station rooms, has three low interior rooms with finishes similar to the turbine room. The undecorated locker room, added on the exterior ground level below the boiler room floor, required a short stairway (Figure 5).

Equipment, Operations, and Ash Disposal System

In the boiler room, the inclined conveyor from the viaduct fed crushed coal to another conveyor running northeast-southwest over the center of two metal coal bunkers, the latter conveyor being equipped with a standard belt and tripper mechanism to feed the bunkers. From the bunkers, eight chutes in the firing aisle fed the eight Edge Moor boilers, arrayed in four groups of two. These were three-drum inclined-water-tube boilers, with drums and tubes entirely supported on structural steel with independent non-load bearing firebrick furnace walls. Each boiler was equipped with a rear-ash-discharge underfeed Riley stoker, as noted above (Figures 5-7). Forced-draft combustion air was produced by two Creen Fuel Economizer Company fans in the basement (American Society of Mechanical Engineers 1920: 103; VIEW SOUTHWEST OF BOILER ROOM FIRINC AISLE; DETAIL VIEW NORTHWEST OF BOILER REMAINS...; VIEW SOUTHWEST OF BOILER ROOM INTERIOR; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 142, 155).

Each boiler fuel bed was angled down to the back of the furnace and clinkered coal (slag) continuously moved down into a trough for dumping every four hours into cars in the basement. A line of narrow-gauge, 3x3-inch T-rail tracks centered 25.5 inches apart ran under each furnace discharge to allow positioning of four-wheel side-tipping dump cars. The tracks, now largely covered with debris, formed a loop in the basement. Turntables at the end of each track rotated cars 90 degrees onto a single track which exited up and out of the basement southeast via doors in the easternmost bay. Pushed by men, the ash cars traveled along a 9-foot-wide, 16-foot high ell-shaped concrete enclosure, running a course of 180 feet. During station operations after c1940, ash was dumped over the end of this track system, and dispersed on the ground by an undocumented mobile crane. Originally, there may have been an undocumented, now-vanished trestle system extending the track in another ell to the undocumented concrete structure perpendicular to the viaduct. Original ash disposal operations may also have included a battery-powered or outside-conductor electric locomotive pulling the cars (WMECO 1955a; VIEW WEST...; VIEW SOUTHEAST OF TRESTLE, COAL CONVEYORS...; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 119, 120, 127, 130; personal communication, Anthony M. Lipski).

Boiler gases vented at the rear of each boiler into a metal breeching system which fed into the brick flue to the stack on the southeast side of the building, with part of the breeching passing between the coal bunkers. The boilers were re-tubed in 1951-52, and were largely demolished c1963, but boiler wall and stoker fragments remain, as do most bunker and breeching components. A catwalk system around the boiler room at bunker level survives with limited areas of walkway grills (WMECO 1955a; DETAIL VIEW NORTHEAST OF BOILER VENTS...).

The boilers generated steam at 225 psi, 550 degrees F., a moderate amount of superheat, which was piped down and across to the basement boiler/turbine room wall and then up to the steam turbines through the central well opening. From the boilers, two steam lines under the floor fed steam to two 1800-rpm General Electric turbines in the turbine room, which were direct-connected to two General Electric 15,000 kw, 13,500 volts AC generators. Each generator had a simple, or multi-path, radial ventilation system discharging at the bottom of the unit. The generators were occasionally loaded to 16,000 kw. An extension of each shaft powered a low-voltage DC exciting generator for magnetizing the main fields. A third, additional exciter was powered by an electric motor, on the northwest side of the central well opening (Tarboux 1927:94; WMECO 1955a; Figure 5; VIEW SOUTHWEST OF TURBINE ROOM INTERIOR...; VIEW NORTH OF TURBINE ROOM INTERIOR...; VIEW WEST OF TURBINE ROOM INTERIOR; HAMPDEN STATION; personal communication, Anthony M. Lipski; Turners Falls Power and Electric Company [historic views]: 179, 180, 200-H).

Turbines were controlled locally by valves and gauge stations at each unit. Bearings were oil lubricated with continuous water supply to take off the heat from the bearing shells. High tension generator output was switched inside the station by motor driven oil circuit breakers in brick compartments along the southwest wall. These were remote controlled from a central switchboard along the same wall, immediately to the southeast, at main floor level. The current was then fed to the outdoor transformer yard, via a vault under the turbine room, and stepped up to 69,000 volts for transmission to the Turners Falls Power and Electric grid. A fatal accident at the circuit breakers c1949 killed one man and fatally injured another. All turbine room equipment has been removed except for two disarticulated generator rotors, and bare remains of bus panels and switchboards on the southwest turbine room wall (VIEW SOUTHWEST OF TURBINE ROOM INTERIOR...; VIEW WEST OF TURBINE ROOM INTERIOR; personal communication, Anthony M. Lipski).

Historic views suggest the jet condensers, one beneath each turbine, were low-level countercurrent rain types, probably made by the Wheeler Condenser & Engineering Company of Carteret, New Jersey (*Engineering News* 1915). As noted, centrifugal pumps supplied river water to the condensers. Two steam-powered air ejector pumps, replaced in 1956, removed entrained air. A bypass near the condensers allowed the turbines to run atmospheric (non-condensing) with the exhaust going up a spiral riveted pipe to the roof, if condensing water intakes became clogged. The plant rating in that case would go down to about 20,000 kw. Some of the condensed steam and condensing water was pumped out to the cove southeast of the plant, using four pumps; some was also stored in the hot well under the turbine room floor, and then sent to the feed water heater in the boiler room by a centrifugal pump. The feed water heater was an open type which mixed steam and feed water to raise the inlet temperature to boiling, and was probably made by the H.S.B.W.-Cochrane Company of Philadelphia. Several auxiliary steam turbines provided the main source of steam for the feed water heater, which also had an automatic valve that fed in live steam from the boilers to make up any drop in temperature caused by a shortage of exhaust steam. After passing through the heater, the feed went back down to the turbine room floor where high pressure centrifugal pumps forced it into the boilers at about 300 psi; one pump was electric, the others were powered by single-stage steam turbines. Additional boiler feed water was brought in from the Connecticut and Chicopee rivers, and pumped up to a roof storage tank to serve as a make-up feed for system losses, and for any instances when the main turbines were shut down or running atmospheric. The river water was treated to prevent boiler scaling. Except for some remnant pipes, none of the water handling systems survive and there is very little documentation on them

(WMECO 1955a, 1956; DETAIL VIEW OF JET CONDENSER...; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 121, 123, 162; personal communication, Anthony M. Lipski).

Stack

A below-grade 13.5-foot-high concrete base supports the stack, centered 25 feet from the boiler room, which rises about 262 feet above ground level with an outside base diameter of 24 feet. At ground level, there is a 12'3"-high reinforced concrete base, sheathed with cast concrete block matching the block used on the building exteriors. Above the base, the stack has a firebrick lining probably rising at least 50 feet higher than the gas inlet; the lack of boiler economizers, which reduce stack gas temperature, and the heavy boiler forcings would have dictated a high or even full-height lining (Meyer 1912: 194). The stack exterior above the base is red brick; it was unclear prior to demolition if exterior brick was radial or common. Stack outside diameter narrows to 15 feet. Below the top, the red brick forms a geometric pattern against a band of tan brick (VIEW NORTH OF HAMPDEN STATION...; VIEW NORTHEAST OF CONDENSER WATER INTAKE...; VIEW SOUTH OF NORTHEAST FACADE AND STACK; VIEW NORTHEAST OF HAMPDEN STATION...; HAMPDEN STATION; Turners Falls Power and Electric Company [historic views]: 52, 53).

Other Features

The largely undocumented water intake system begins on the Connecticut River at a concrete structure about 25 feet high with four openings across its 47-foot-wide mouth; some historic views suggest another intake on the Chicopee River. The equally undocumented water discharge systems ends at the cove in a 5-foot-diameter pipe encased in a small concrete outfall structure with wing walls. The transformer yard, on concrete deck and supports, had two transformer banks c1955, each with three 3600 KVA single phase and 1 6000 KVA three-phase water-cooled units, requiring a piped water supply from the plant. There is no documentation on original transformer yard equipment. In 1955, six 5000 kva single phase transformers replaced this equipment. The transformer yard is now totally stripped of equipment, surviving only as an array of concrete pads (WMECO 1955b; Figure 4; VIEW NORTH OF HAMPDEN STATION...; VIEW NORTHEAST OF CONDENSER WATER INTAKE...; AERIAL VIEW TO EAST; personal communication, Anthony M. Lipski; Turners Falls Power and Electric Company [historic views]: 38, 58, 68, 104, 163).

Part III - Sources of Information

Original Drawing

Only one drawing of Hampden Station has survived, as a photograph once made from a now-destroyed glass negative, and is reproduced as HAMPDEN STATION. This photograph, along with a recently-produced copy negative, are held by Northeast Utilities, 107 Seldon Street, Berlin, CT 06037-1616. In 1992, Charles E. Momnie, Fossil/Hydro Engineering, had custody of the material, which along with other historic views noted below were transferred to Northeast Utilities sometime after the company was formed by the 1966 merger of WMECO, Connecticut Light and Power, and the Hartford Electric Company.

Historic Views

Turners Falls Power and Electric Company took a large number of Hampden Station construction photographs, with numbered negatives. These are also held by Northeast Utilities, at the above address. Some are reproduced, along with one of several aerial views taken after station closing; the aerial views are held by Tighe and Bond, Inc., engineering consultants, in Westfield, MA. Published historic views, including several with the free-standing station sign appear in Abercrombie 1925: 20, WMECO 1955a, and some other issues of WMECO *Hi-Lines*.

Interviews

Robert E. Barrett, former WMECO president, November 1992.
Paul Dwyer, WMECO. November 1992.
Anthony M. Lipski, former assistant superintendent, Hampden Station. November 1992 - January 1993.

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Western Massachusetts Electric Company (WMECO)
1955a Hampden Station opens its door!. *Hi-Lines* June 1955.

1955b Moving day for transformers...insures better service. *Hi-Lines* July 1955.

1955c Hampden Station reports. *Hi-Lines* October 1955.

1956 An elderly lady gets a helping hand. *Hi-Lines* September 1956.

1963 Hampden Station. *Hi-Lines* November 1963.

1964 Hampden Station Sold. *Hi-Lines* March 1964.

1971 Plan of Land in Chicopee, Mass. Drg. No. AA-22615.

Sources Not Yet Investigated

No primary written material on Hampden Station was located during this documentation, although it is possible that some yet survives at WMECO headquarters in West Springfield, MA. There may also be additional information in WMECO newsletters and local newspapers. A search of some contemporary electric power industry journals yielded almost no mention of this plant, probably reflecting the plant's very typical nature amidst the flurry of contemporary power plant construction during World War I. It is not likely that other such journals would have significant new information.

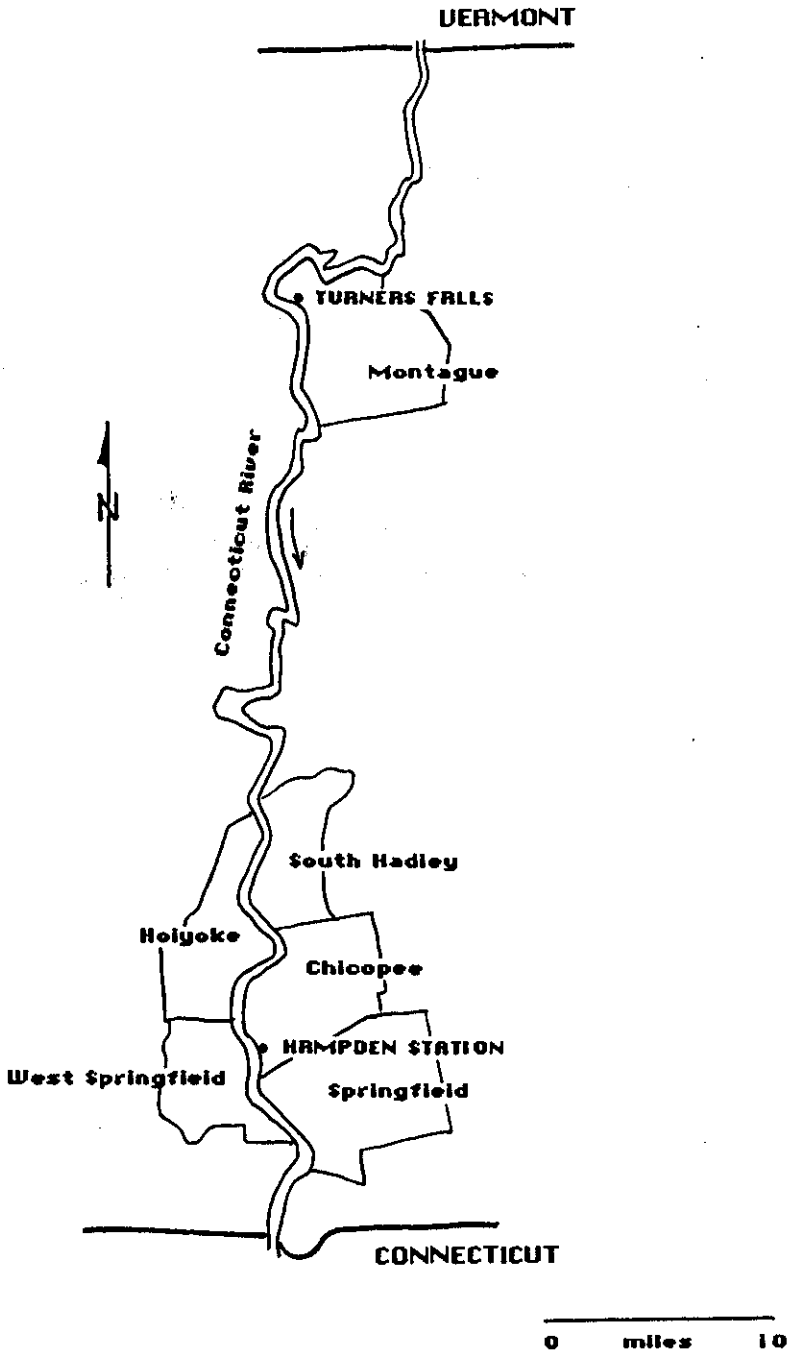


Figure 1. CONNECTICUT RIVER VALLEY SITE CONTEXT IN MASSACHUSETTS

Figure 2. SITE LOCATION
base map: U.S.G.S. Springfield North, Mass., quadrangle

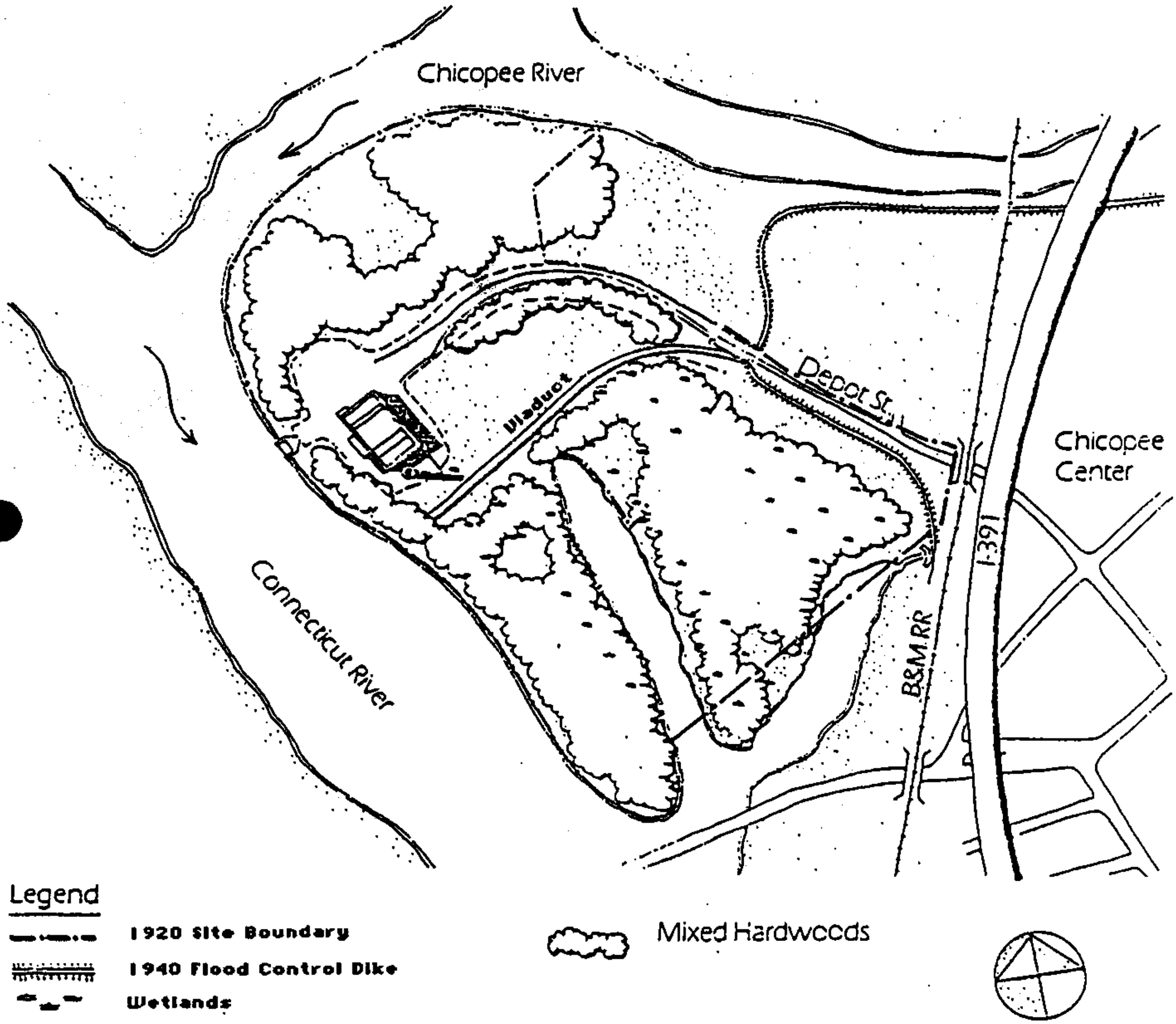


Figure 3. LOCAL SITE CONTEXT MAP
base map: City of Chicopee, Office of Community Development 1992

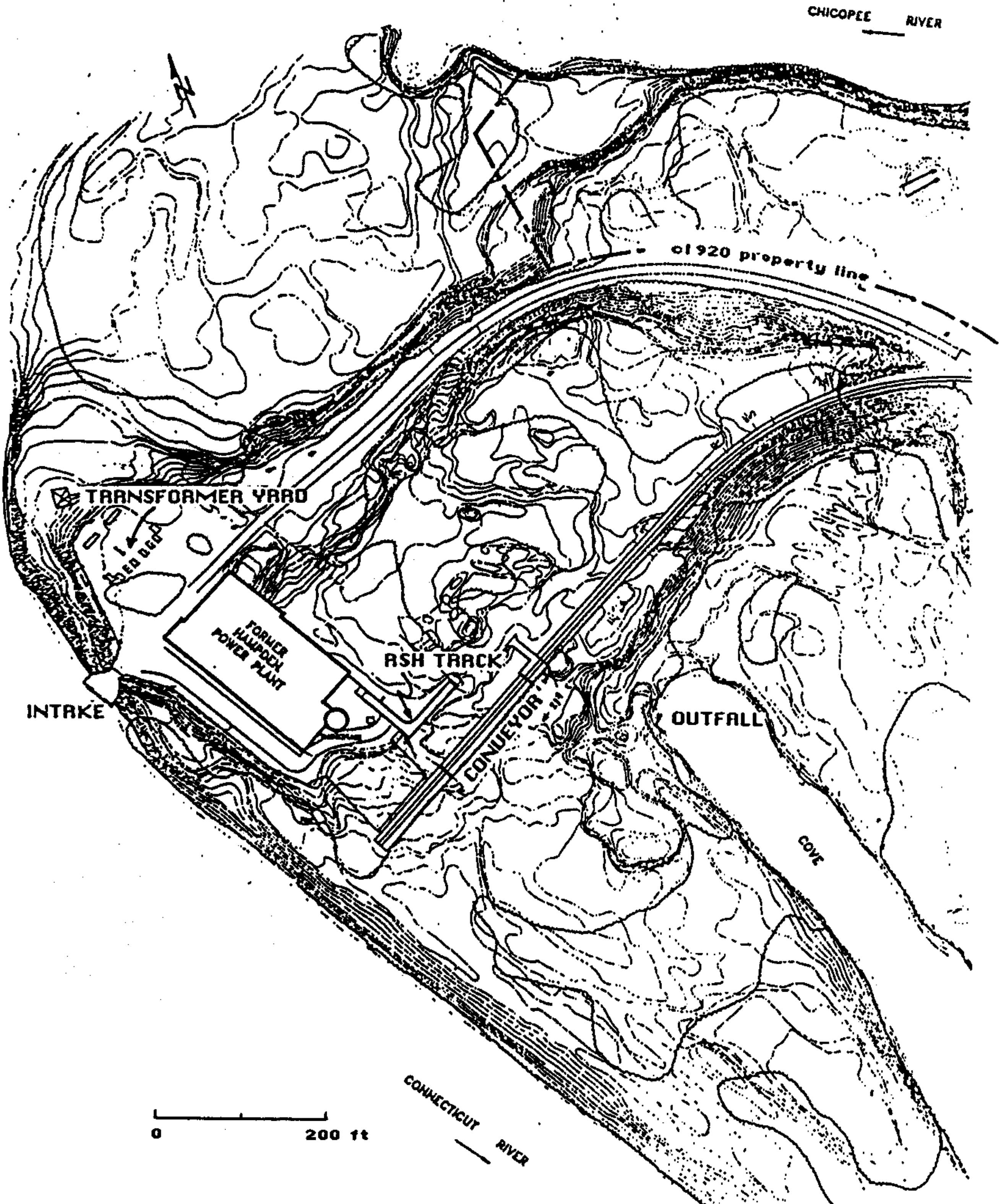


Figure 4. TOPOGRAPHIC SITE PLAN
base map: Tighe and Bond, Inc. 1992

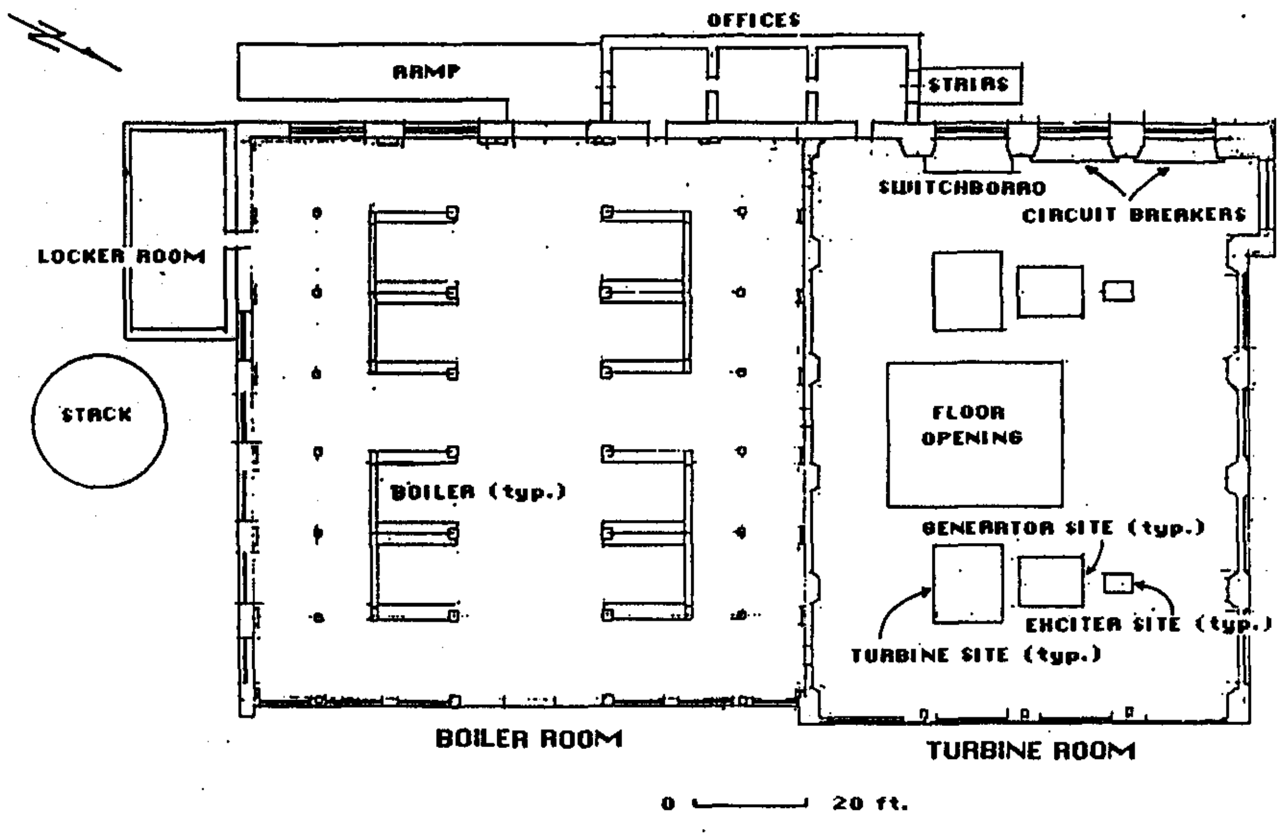
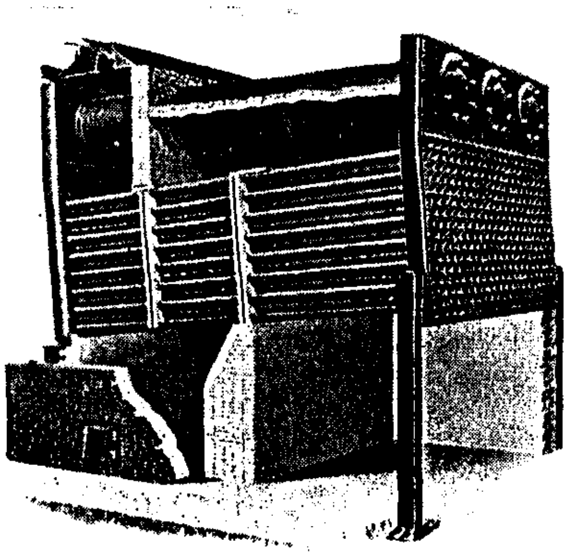
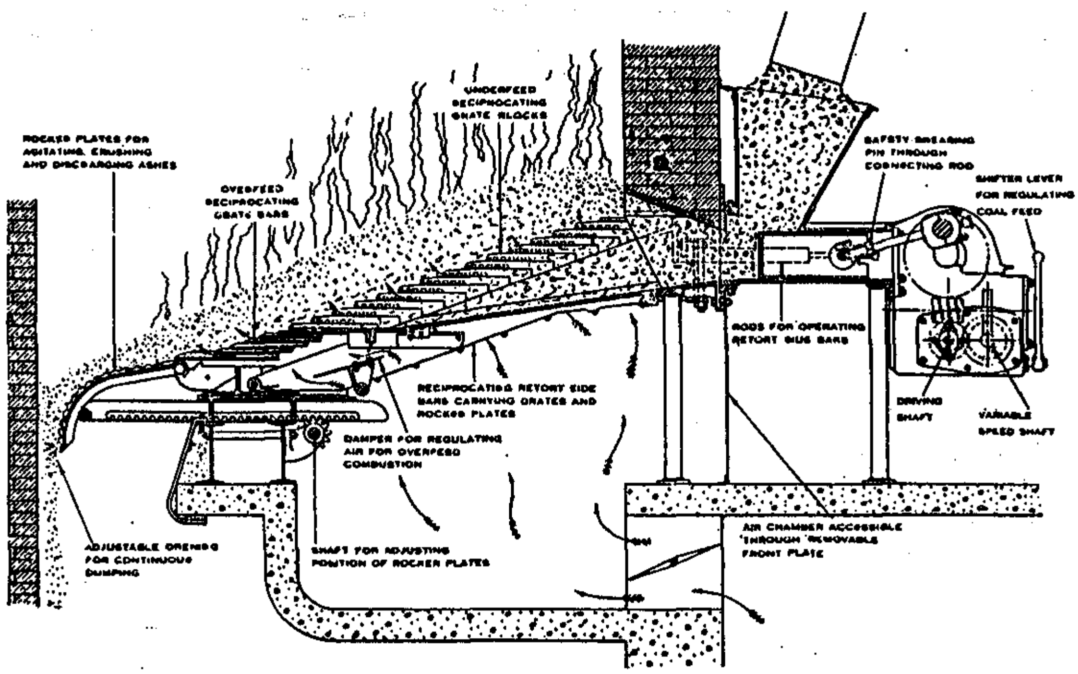


Figure 5. SKETCH FLOOR PLAN OF MAIN FLOOR LEVEL



The Edge Moor Water Tube Boiler

Figure 6
source: American Society of Mechanical Engineers 1920: 63



THE RILEY SELF-DUMPING UNDERFEED STOKER

Figure 7
source: American Society of Mechanical Engineers 1920: 126